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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,698	02/13/2002	Junichi Kinoshita	81788.0216	1843

7590 12/19/2003

Hogan & Hartson, LLP
Suite 1900
500 South Grand Avenue
Los Angeles, CA 90071

EXAMINER	
FLORES RUIZ, DELMA R	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 12/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/076,698	KINOSHITA, JUNICHI	
	Examiner	Art Unit	
	Delma R. Flores Ruiz	2828	AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Priority

Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. § 120 as follows:

This application is claiming the benefit of a prior filed nonprovisional application under 35 U.S.C. 120, 121, or 365(c). Copendency between the current application and the prior application is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 4, 8, 9, 12, 13, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 3, 4, 8, 9, 12, 13, recite the limitation "zinc blend structure crystalline structure" in claims 3, 4, 8, 9, 12, 13. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Jiang et al. (6,339,607).

Regarding claim 1, Jiang dislcoses a surface emitting laser comprising: a semiconductor substrate (see Figs. 1A-B Character 101); and an active layer (see Figs. 1A-B Character 104) made on a first major surface of said semiconductor substrate (see Figs. 1A-B Characters 101), so that light output from said active layer (see Figs. 1A-B Character 104) be obtained in a direction substantially normal to said major surface of said substrate, said active layer having side surfaces which are offset from vertical planes normal to said major surface of said semiconductor substrate to prevent in-plane horizontal resonance of light in said active layer (see Figs. 1 – 4).

Regarding claim 2, Jiang discloses a first optical reflector (see Figs. 1A-B Character 102) interposed between said semiconductor substrate and said active layer (see Figs. 1A-B, Character 104); and a second optical reflector (see Figs. 1A-B, Character 112) provided on a superstrate side of said active layer, all side surfaces (see Fig. 1A-B, Characters 111A-B) of said active layer being offset from vertical planes normal to said major surface.

Regarding claim 5, Jiang discloses side surfaces of said active layer are made by cleavage (Column 6, Lines 10 – 39).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 4, are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (6,339,607) in view of Kondow et al (5,912,913).

Regarding claim 3, Jiang discloses the claimed invention except for semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure. It would have been obvious at the time of applicant's invention, to combine Kondow of teaching a semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure with laser because it would have been obvious to one having ordinary skill in the art at the time the invention was made to semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure (Column 4, Line 51 – 65), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claims 4, Jiang discloses the claimed invention except for substrate and said active layer and waveguide layer are made of semiconductors having a zinc blend structured crystalline structure, said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than 3^0 from the [100] plane. It would have been obvious at the time of applicant's invention, to combine Kondow of teaching a semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure with laser because it would have been obvious to one having ordinary skill in the art at the time the invention was made to semiconductor substrate and said active layer are made of

semiconductors having a zinc blend structured crystalline structure (Column 4, Line 51 – 65), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. It would have been obvious to one of ordinary skill in the art at the time the invention was made to said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than 3^0 from the [100] plane, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. However, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. Therefor, the Applicant is discovering the optimum or workable range of the discloses prior art.

Claims 6, is rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (6,339,607) in view of Furukawa et al (6,507,594).

Regarding claim 6, Jiang discloses the claimed invention except for anti-reflection a dielectric thin film is coated onto said side surface of said active layer. It would have been obvious at the time of applicant's invention, to combine Furukawa of teaching a anti-reflection a dielectric thin film is coated onto said side surface of said

active layer with laser because anti-reflection is a layer of material of lower refractive index of just the right thickness (1/4 wave) is deposited on the optical surface to be coated. More complex coatings are possible which cover a large wavelength range.

Claims 7, 10, 11, 14, 15, 16, is rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (6,339,607) in view of Furukawa et al (6,507,594), further in view of Kinoshita (4,958,357).

Regarding claim 7, Jiang discloses the claimed invention except for a waveguide layer provided on said major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction being offset from vertical planes normal to said first major surface of said substrate. It would have been obvious at the time of applicant's invention, to combine Furukawa iv view of Kinoshita of teaching a waveguide layer provided on said major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction being offset from vertical planes normal to said first major surface of said substrate with laser because a grating is provided along the

waveguide structure, and Bragg diffraction from the grating is used for optical feedback. Because of wavelength selectivity in accordance with the period of the grating, DFB lasers are capable of oscillating in a single longitudinal mode. DFB lasers having 2nd-order gratings are capable of emitting radiation mode light normal to the waveguide direction. A surface emitting laser comprising 2^{nd} order grating along the waveguide direction for obtaining a beam with high directivity (Kinoshita (abstract)).

Regarding claim 10, Jiang discloses the facets of said active layer made by cleavage (Column 6, Lines 10 – 39).

Regarding claim 11, Jiang discloses a cladding layer (see Figs. 1A-B, Character 106) provided on said waveguide layer; and an electrode (see Figs. 1A-B, Character 110) provided on said cladding layer, said cladding layer being selectively made in a central part of said laser to form a ridge stripe, said electrode being electrically connected above said ridge stripe but electrically insulated near facets at opposite ends of said ridge stripe (see Figs. 1 A-B).

Regarding claim 14, Jiang discloses facets (see Fig. 1A Characters 111A and 111B) of said active layer (see Fig. 1A Character 104) and said facets of said waveguide layer are made by cleavage (Column 6, Lines 10 – 39).

Regarding claim 16, Jiang discloses the claimed invention except for anti-reflection a dielectric thin film is coated onto said side surface of said active layer. It would have been obvious at the time of applicant's invention, to combine Furukawa of teaching a anti-reflection a dielectric thin film is coated onto said side surface of said active layer with laser because anti-reflection is a layer of material of lower refractive index of just the right thickness (1/4 wave) is deposited on the optical surface to be coated. More complex coatings are possible which cover a large wavelength range.

Regarding claims 17, and 19, Jiang discloses the claimed invention except for a waveguide layer provided on said major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction being offset from vertical planes normal to said first major surface of said substrate. It would have been obvious at the time of applicant's invention, to combine Furukawa iv view of Kinoshita of teaching a waveguide layer provided on said major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction being offset from vertical planes normal to said first major surface of said substrate with laser because a grating is provided along the waveguide structure, and Bragg diffraction from the grating is used for optical feedback. Because of wavelength selectivity in accordance with the period of the

grating, DFB lasers are capable of oscillating in a single longitudinal mode. DFB lasers having 2nd-order gratings are capable of emitting radiation mode light normal to the waveguide direction. A surface emitting laser comprising 2^{nd} order grating along the waveguide direction for obtaining a beam with high directivity (Kinoshita (abstract)).

Regarding claim 18, Jiang discloses waveguide direction being offset by an angle other than 45^0 from any of the sides of the substantial rectangle, (Column 6, Lines 10 – 30).

Claims 8, 9, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (6,339,607), in view of Furukawa et al (6,507,594), further in view of Kondow et al (5,912,913).

Regarding claims 8, 12 and 13 Jiang in view of Furukawa discloses the claimed invention except for semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure. It would have been obvious at the time of applicant's invention, to combine Kondow of teaching a semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure with laser because it would have been obvious to one having ordinary skill in the art at the time the invention was made to

semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure (Column 4, Line 51 – 65), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 9, Jiang in view of Furukawa discloses the claimed invention except for substrate and said active layer and waveguide layer are made of semiconductors having a zinc blend structured crystalline structure, said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than 3^0 from the [100] plane. It would have been obvious at the time of applicant's invention, to combine Kondow of teaching a semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure with laser because it would have been obvious to one having ordinary skill in the art at the time the invention was made to semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure (Column 4, Line 51 – 65), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. It would have been obvious to one of ordinary skill in the art at the time the invention was made to said first major surface of said semiconductor substrate having a surface

orientation slanted by an angle not less than 3^0 from the [100] plane, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. However, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. Therefor, the Applicant is discovering the optimum or workable range of the discloses prior art.

Claim 20, is rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (6,339,607) in view of Lebby et al ((5,498,883)

Regarding claim 20, Jiang discloses the claimed invention except for a supporting member; a surface emitting laser mounted on said supporting member; and a packaging member enveloping said surface emitting laser. It would have been obvious at the time of applicant's invention, to combine Lebby of teaching a supporting member; a surface emitting laser mounted on said supporting member; and a packaging member enveloping said surface emitting laser with laser because the supporting member use to support a laser and a packaging member is used to protect the laser of the environment (example; temperature, dust, etc).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Delma R. Flores Ruiz whose telephone number is (703) 308-6238. The examiner can normally be reached on M - F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3431.

Delma R. Flores Ruiz
Examiner
Art Unit 2828

Paul Ip
Supervisor Patent Examiner
Art Unit 2828

DRFR/PI
December 10, 2003